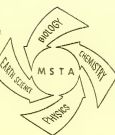


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MSTA



Montana Science Teachers Association

Volume 5, No. 6

MAY 1987

Science Fair 1987: Teachers Count Too!

The annual state science fair held in Missoula on April 10 was strong evidence of teacher encouragement and student involvement in science projects. More than 400 entries were displayed in the fieldhouse at the University of Montana. Forty-four of them won major prizes.

Local newspapers have already acknowledged the students' achievements. This newsletter will recognize the 28 teachers who coached these meritorious students.

Creighton Stelner of Browning High sponsored four award winners. James Cusker of Sentinel High, Missoula and Larry Fauque of Sunburst High also had four high achievers each. **Gaye Genereux** and **Orville Graddock** of Big Sandy brought three winners each to the fair; **James Harkins** of Big Sky High, Missoula, and **Fred Seidensticker** of K-G High, Kremlin, each had two. Individual winners brought credit to **John Jose**, **Mick McClafferty**, and **Louis Vicevich** of Butte High; **Bill Peterson** and **Jerry Sept** of Cascade High School; **Stella Roberts** of Hellgate High School, Missoula; **Faye Lawler** of Bridger High School and **Robert Emmons** of Hysham High School.

Fair contributions were strong evidence of enthusiasm for science among seventh and eighth grade students. Noteworthy teachers behind the award-winning projects are: **Robert Benke**, Somers School in Kalispell; **Gary Benton** and **Jean Lind**, East Junior High, Butte; **John Briery**, Deer Park, Columbia Falls; **Dean Drenzek**, Browning Middle School; **Robert Edwards**, Creston, Kalispell; **Jim Fitzpatrick**, Charlo Junior High; **Gaye Genereux**, Big Sandy Public; **Ken Holste**, Trinity Lutheran, Kalispell; **Doug Knapton**, Cut Bank Junior High; **Peggy Krebill**, Woodman, Lolo; **Richard Micheletto**, Washington, Missoula; **Robert Ross**, Sunburst Junior High; **Fred Seidensticker**, K-G School, Kremlin, and **Rosan Stover**, Bozeman Junior High.

MSTA acknowledges the dedication and extra effort that local teachers contributed to the science fair by inspiring their students to "think science." Congratulations to all of you!

Coming Attraction! Billings To Host MSTA, MEA, MCCE, MCTM, and SSMA

Refreshment, renewal and professional growth will be on the menu October 14-17, 1987. Four state teacher organizations and the national School Science and Math Association will all convene in Billings, Montana. An estimated 3,000-4,000 teachers are expected to attend the numerous presentations and workshops and take advantage of selected tours. Your MSTa registration will allow you to attend any organization's sessions.

The fall convention will be headquartered at the Billings Plaza Holiday Inn where a block of rooms has been reserved for SSMA/MSTA participants. Single/double occupancy room rates range from \$47 to \$67. Reservations should be made directly with the Billings Plaza (406) 248-7701.

Share your interests and concerns with colleagues from Montana and from other parts of the USA. Come to Billings in October! For further information contact **Jerry Jinke**, 1987 SSMA Chair, (406) 657-2392 or 2315.

AAPT NATIONAL SUMMER MEETING

The American Association of Physics Teachers will hold its annual summer meeting on the campus of Montana State University on June 15-19, 1987. Approximately 800 physics teachers are expected to participate in such activities as research tutorials, computer workshops, contributed paper sessions, research symposia and invited sessions on myriad topics. There will also be many special functions such as a picnic preceded by a Physics Olympiad and accompanied by old-time fiddle music, a banquet with Montana's astronaut **Loren Acton** as featured speaker, and an opening reception with the textbook and equipment exhibitors.

Please take advantage of this opportunity to interact with physics teachers from across the nation. For more information, write **Larry Kirkpatrick** or **Gerry Wheeler**, Physics, Montana State University, Bozeman, Montana 59717.

Young Kalispell Scientists Gather Data on Acid Rain

Reprinted from the Missoulian, April 21, 1987

A fourth-grade class at Cornelius Hedges School will take part in a nationwide acid-rain experiment sponsored by the National Geographic Society.

The society's Kids Network is asking 31 schools across the United States to gather data on the acidity of rainwater.

Steven Plympton's class at the Kalispell school will be doing the honors for the Northern Rockies region.

Although most areas of the country are represented, the participating schools tend to be concentrated in areas where there are a number of acid-sensitive lakes. Kalispell was apparently chosen because of its proximity to Glacier National Park, Plympton said.

"It fits in so well with what we on the Science Curriculum Committee are trying to bring to our science program," he said.

Research has shown, and Plympton says he has found, that a hands-on experimental approach to science education gives students a better and longer-lasting understanding of the subject.

"It's neat to see people coming up with, finally, something besides a textbook approach," he said.

Chautauqua Short Course

Larry Kirkpatrick has applied to the National Science Teachers Association for a grant to conduct a Chautauqua Short Course for 30 high school science teachers. Funding is not assured, but looks promising. This course meets for two days in the fall (Friday and Saturday) and two days in the spring. Next year's topic will be on interfacing experiments to Apple II+ or IIs computers. Participants will receive a stipend (probably \$100), about \$130 in interfacing equipment, room and board, and partial support for travel. School districts must agree to provide substitutes and access to a computer. Teachers must agree to complete a project in the interim period and report on this project at the spring meeting. Two graduate credits will be available.

Science teachers interested in attending should send their name, school and summer address to Larry Kirkpatrick, Physics, MSU, Bozeman, MT 59717. When funding is approved, application blanks will be mailed.

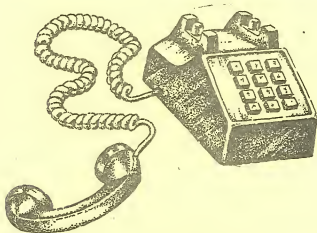
Join NSTA at Salt Lake City!

On September 24-26, NSTA heads west to Salt Lake City, Utah, for the first area convention of 1987. Bring your camera and lots of film with you because Salt Lake City is considered to be one of the most beautiful cities in America.

While you're here, make time to join our tours. On Wednesday, September 23, we've scheduled two overnight tours—one to Arches and Canyonland National Parks and the other to Dinosaur National Monument and the Uinta Mountains. You'll revel in the glory of this geography. On Thursday, take your choice of tours of the Artificial Heart Research Center; Timpanogos Cave National Monument, a series of three limestone caves; Kennecott Copper's Bingham Canyon Mine, home of the world's largest human-made hole in the ground; the Great Salt Lake, and much more!

And don't forget the sessions! General session speakers include Drasko Jovanovic of Fermi National Accelerator Laboratory, Mary Budd Rowe (NSTA President) and Paul Saltman of the University of California at San Diego, our Friday night banquet speaker. Choose from a wide variety of hands-on workshops, demonstrations and instant updates on topics like chemical fingerprints, cigarette smoke and the cleaning mechanism of the lungs, discovering dinosaurs, prospecting Sunlight Basin, the chemistry of exercise, an expedition to Yellowstone, physics in the greenhouse and lots more.

More information about the Salt Lake City area convention will be available in a special advance program which NSTA members should receive this month. If you need more information about the Salt Lake City convention, please call or write NSTA Headquarters, 1742 Connecticut Avenue, Washington, D.C. 20009.



Let's Hear From You

This publication is for all people who teach science in Montana. What's the news about science education in your area? Let us know about your plans and successes. Write or call the editor, Doris Simonis, School of Education, University of Montana, Missoula, MT 59812 (406) 243-5204.

MSAAPT Fall Meeting

Once again the Montana Section of AAPT will hold its fall meeting with MSTA. The meeting is scheduled for Thursday and Friday, October 15-16. If you would like to contribute a paper on your favorite topic or would like to suggest a speaker or topic, please contact Len Porter, Physics, University of Montana, Missoula MT 59812.

Under the Big Sky...

Hellgate Elementary School, Potomac School and Missoula County High School's Vo-Ag Center have won the Missoula County Conservation District's outdoor classroom award. The schools will divide the \$500 cash award for proposals submitted to the conservation district by teachers. Hellgate teachers Jack Sturgis and Steve Harris proposed developing a nature trail near the Clark Fork River. The proposal from Potomac teachers Andrea Onken and Bruce Hall involves implementing a plan on the school grounds to control weeds, seed grass, and plant trees and shrubs. Harold Knapp, forestry teacher at the Vo-Ag Center, will use his school's share of the money to buy trees for a shelterbelt and demonstration orchard on a 10-acre field between the center and South Avenue.

Expanding Your Horizons Conference Committee of Missoula awarded three scholarships of \$200 each to science-talented high school seniors. The winners were Jennifer Bailey of Sentinel High, Missoula, who plans to be a veterinarian; Suzanne Fairback of Alberton High School who aims to be a physician, and Jackie Gossard of Seeley-Swan High School in Seeley Lake whose interests are in computer science and engineering.

MSTA members Linda Robinson of Billings and Randy York of Missoula will be assisting John Rogan and other faculty of Western Montana College at a summer workshop in Dillon on "Creative and Effective Teaching of Science," June 15-July 10.

Resources for Teachers

Lessons on Grizzly Bears are made easy by the kit loaned to teachers by the National Park Service. A slide/cassette program for students age 12 and above illustrates life history of the bears and their struggle to survive in the Yellowstone region. *Bears of Yellowstone* and other written materials plus a simulation game are included in the package. To borrow the program, contact Joe Zarki or Jack de Golia, National Park Service, PO Box 168, Yellowstone National Park, WY 82190 (307) 344-7381.

A comprehensive array of space shuttle graphics plus a handsome color poster of Challenger with Christa McAuliffe's quote, "I touch the future. I teach" is available FREE from Civil Air Patrol. Order the space shuttle posters on school letterhead from: HQ CAP/EDF, Maxwell AFB, AL 36112-5572.

Blue Sky Below My Feet is an award-winning series of films aimed at 9- to 12-year-old children. The three half-hour TV shows introduce them to space technology and how it relates to life on earth: 1) Gravity and Forces; 2) Fiber and Fabrics; 3) Food and Nutrition. Each program is available in a variety of formats, including 16mm film and videocassettes ($\frac{3}{4}$ ", VHS and Beta). A *Mission Manual* of learning activities and a teacher's guide come with the programs. For more information, contact National 4-H Council Supply Service, 7100 Connecticut Avenue, Chevy Chase, MD (301) 961-2934.

FREE samples of activity booklets for children are available from American Chemical Society, Pre-high School Science Program, Room 806, 1155 Sixteenth Street NW, Washington, DC 20036. Ask for a single copy each of "Chemistry Brainteasers" for elementary students, "Chemistry Adds Dimension to Your Life" for elementary-middle school, "A Chemistry Project From Start to Finish" for middle school students.

Also from the American Chemical Society (address above) is a curriculum packet on Science-Technology-Society for middle and junior high students. Titled "Combating the Hydra," this resource costs \$5.50.



YOUR NEWS belongs here. Please send items for the fall newsletter to Doris Simonis, University of Montana, Missoula, MT 59812, before August 20, 1987.

Summer Teacher Workshops Scheduled: Environmental Education and Montana

Lolo, Flathead, Helena and Bitterroot National Forests are sponsoring two summer workshops for teachers interested in environmental education. The history of conservation in the United States and progress of environmental education in Montana will be two of the topics considered during these seminars.

The first workshop will be held June 25-28 in the Rattlesnake Wilderness area. Starting Thursday evening, it will continue daily on Friday and Saturday, and conclude on Sunday afternoon. There are no overnight nor Sunday morning sessions. Registration is \$10. Teachers may earn two graduate credits (optional) for the course by paying an additional fee of \$35.

The second workshop will be held at Yellow Bay on August 23-26, from Sunday noon until Wednesday noon. The \$70 fee includes room and board at Yellow Bay (3 nights, 8 meals). Registration for two graduate credits (optional) is an additional \$35.

For further information and registration forms, contact Ginny Tribe, Lolo National Forest, Fort Missoula Bldg. 24, Missoula, MT 59801 (406) 329-3832, or Bob Krepps, Helena National Forest, Federal Bldg., Helena, MT 59626 (406) 449-5201.

One Class "Squash Method" Illustrates Chromatography

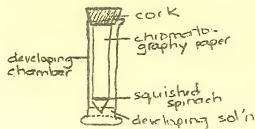
Linda deKurt of Flathead High School, Kalispell, uses the following method as an alternative to BSCS Inv. 12.2. She reports dramatic results and time saved by eliminating the traditional pigment extraction step.

Separation of Leaf Pigments (Alternative Procedure and Materials)

WARNING: Touch chromatography paper only at edges. Put name on top. Don't inhale the developing solution. Purge system should be on in lab for duration of experiment (and then some).

Materials

- 100 ml graduated cylinder (developing chamber)
- cork
- tack
- spinach leaf
- chromatography paper (20 cm. strip)
- ceramic tile
- stirring rod
- 10 ml developing solution (8% acetone, 92% petroleum ether)
- scissors



Procedure

1. Clip point at end of tape.
2. Measure correct length of tape by holding against chamber; tip of tape should be long enough to touch developing solution and fold should be made at top of cork. Leave an extra 1 cm. above fold. Write name above fold.
3. Using stirring rod and ceramic tile, pulverize two layers of spinach along a straight line above the beginning of point on chromatography tape.
4. Secure tape to bottom of cork with tack.
5. Place tape in chamber. Leave 30 minutes.
6. Remove tape from tack. Mark separated pigments. Air dry before stapling into data book.

Measuring a Root's "Holding" Strength

Soak 12 large seeds like lima beans in water overnight. With a very small drill or darning needle, make a hole through the center of each seed, being careful to avoid the embryo. Thread a 15cm piece of nylon filament fishing line through the hole, and tie the thread into a loop at the ends. Plant each seed in a separate container of soil, NOT soft potting soil, leaving the filament loop outside the soil. Water as appropriate for growing seeds. After 3 or 4 days, attach a loop to a spring scale calibrated in grams. Tug gently on the scale until the first seed is pulled out of the soil. Repeat every other day until each seed has been pulled up, recording the force and examining the growth of the roots. You can also plant seeds against the sides of glass jars so as to see how much the root grows. Use these seeds to record root growth, not force.

Elementary Schools Science Association Newsletter.

*Science &
Technology*

*Our
Common
Heritage*



Subtle Societal Messages Turn Students Off On Science, Professor Says

While children's lives are "battered by the impact of science," many lose interest in science at an early age because their elders send the message that nature is "something we don't like," an educator told school administrators gathered in New Orleans recently.

"Until we have a population of adults who understand the mythical nature of many of our beliefs, we won't have a younger generation that can deal with science and technology" in a healthy way, said David Suzuki, a professor in the zoology department at the University of British Columbia in Canada.

Hands-Off Approach: "Before children even get to school," they learn from the way their parents approach insects and other elements of the natural world that "nature is dirty, dangerous or disgusting," Suzuki said in an address at the annual convention of the American Association of School Administrators.

While the world would be a "radically different place" without the scientific and technological developments of the past several decades, Suzuki noted that many adults do not think science affects them directly. That disconnection with scientific matters is rooted in early experiences of being denied opportunities to explore nature, the area of "greatest interest" to budding scientists, Suzuki said. "I don't know of any scientist who was not interested in nature as a child," but too few are encouraged to pursue it, he said.

Schools too often dampen students' interest by supplying them with an "alienated experience of science" characterized by lab reports and "right and wrong answers," Suzuki said. Instead of encouraging experimentation before looking at the results, he said, most schools start with what should be the "end product" of scientific research by stressing rigid recording of data in lab reports. That process "knocks out the curiosity and excitement" that should accompany science exploration, he said, and leads too many students to graduate from school "ignorant" of the functioning of nature and of the "social context" and responsibilities associated with scientific and technological developments. He also criticized computer instruction in schools, saying it "sets a model for children that the way computers act is the way people's minds act."

Among other effects of poor science schooling, "our uncritical acceptance of the benefits of technology renders us incapable" of steering a sensible scientific course, Suzuki said, noting that threats to nature such as pollution, resource depletion, desertification, deforestation and nuclear annihilation all stem, in part, from misconceptions about science and its role in society.

Out of Control: Myths that must be debunked to reverse those trends include the notion that progress must be linked to continued technological growth, that natural resources must be "managed" or controlled and that technology "is our servant" and "we are its masters," when in fact "the technology we have today is so powerful and so fast that it is already out of human control."

To counter those misbegotten messages, adults must absorb and convey the message that nothing in the universe can grow at an exponential rate indefinitely and that "at the rate we're going...we are exterminating nature faster than we are discovering it," Suzuki said.

Children should be taught that they are "first and foremost animals" who depend on and are "deeply imbedded into" the ecosystem, said Suzuki, adding that science instruction should be revamped to "nurture curiosity" rather than to "pump [children] full of facts" that may become outmoded.—Deborah L. Gold

Education Daily, March 2, 1987

A New Curriculum for Yellowstone National Park

We'd like you to know about *Expedition: Yellowstone*, our new school outreach program. The program will enable students to learn about the world's first national park either by studying it at their school or by combining classroom work with a trip to the park. We call that trip an "Expedition."

Aimed at the 4th, 5th, and 6th grades, the program's curriculum materials consist of a teacher's workbook and storybook, the latter entitled, *Expedition Yellowstone, A Mountain Adventure*. It has original stories about the park, each dealing with one of the major concepts in the accompanying teacher's workbook.

The storybook and teacher's workbook contain a wealth of background information a teacher will need to teach a lesson or a whole unit about Yellowstone National Park, its geology, wildlife, plants, or history. You may also use the materials to teach science, math, social studies, art, or reading.

With the materials, a teacher can "take" students to Yellowstone through the power of words, illustrations and imagination.

The Teacher's Workbook

The teacher's workbook has lessons, activities, and evaluations, all tied to the major concepts, and covering many curriculum areas, including mathematics, science, social studies, and art. The workbook also has registration and logistical information for planning an "Expedition" to the park. The workbook will be published in September 1987.

Expeditions to Yellowstone!

When teachers register for the program, they may reserve accommodations and they are assigned a park ranger to help them plan and prepare their "Expedition." The accommodations are rustic cabins at the Lamar Buffalo Ranch in northeastern Yellowstone. Groups use a heated log building for cooking, eating, showering, and any indoor instruction. The teacher's workbook helps plan meals and lists equipment that students, chaperones, and teachers must bring.

In testing the materials in the park, we already have played host to schools from as far away as Florida and as close as the towns on Yellowstone's boundary. And for one and all, the experience was unforgettable.

Upon arriving in the park, groups meet their park ranger who will share his or her special perspective during the entire "Expedition." The emphasis during an "Expedition" is on field study, conducted on foot. On these walks and hikes the park ranger and teacher conduct activities from *Expedition: Yellowstone!* and other materials, like *Project Wild*, and take advantage of the unique outdoor classroom that is the pristine wilderness of Yellowstone. (We try to avoid spending too much time in vehicles seeing the park only from the road.)

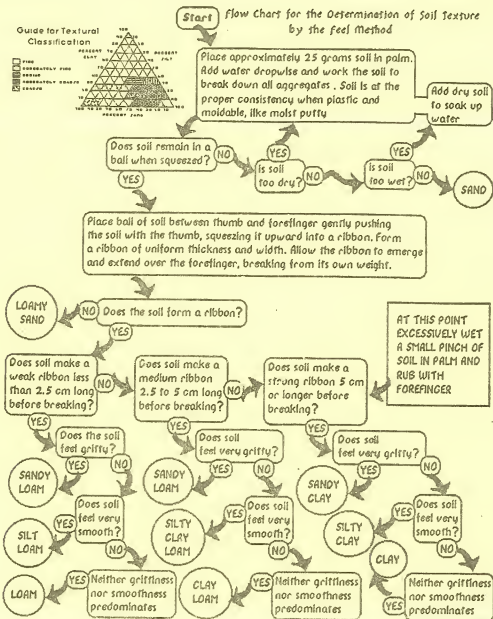
Participating schools can be accommodated from about April 1 to the end of May, and from Labor Day to the end of October. Maximum group size is 39 adults and children. We recommend an adult to child ratio of one to five.

When Can I Bring My Students?

Some teachers have expressed interest in bringing their students to Yellowstone before publication of the *Expedition: Yellowstone!* materials. However, we are suggesting to all teachers that they not plan a trip to the park under the *Expedition: Yellowstone!* program until after the teacher's workbook is published in September.

Questions?

For more information on prices and discounts or to find out more about the program, please call Jack de Golia or Joe Zarki, both park rangers and co-authors of *Expedition: Yellowstone!* at (307) 344-7381, extension 2339, or write to Jack de Golia, National Park Service, P.O. Box 168, Yellowstone National Park, WY 82190.



PRISMS

MSTA, AAPT and the Office of Public Instruction are jointly sponsoring workshops for physical science teachers at the October 15-16, 1987, inservice workshops in Billings. The all day workshop presented on Thursday will be designed for 24 physics teachers and the Friday workshop will be designed for 24 physical science teachers. Each workshop is based on the Iowa Physics Project which has developed the Physics Resources and Instructional Strategy for Motivating Students (PRISMS) teacher's guide. The activities have been developed in a learning cycle which includes exploration, concept development and application. Experiences dealing with Hot Wheels, skateboards, bicycles, etc., are the basis for these high interest activities. Twelve representative activities (of more than 150 listed in the notebook) will be presented. Each participant will be presented a complete set of the PRISMS activities.

The workshops will be directed by Dr. Roy Unruh, University of Northern Iowa, the primary developer of the PRISMS material. Dr. Unruh comes highly recommended and all participants will certainly benefit from their participation.

For further information contact Lindsay Hess, Physics Department, Montana Tech., Butte, MT 59701.

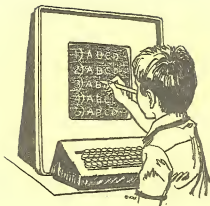
Project Wild Facilitators (Are Now Bigger and Better!!)

Montana now has 16 fully trained facilitators who can conduct teacher inservice for Project Wild or Project Learning Tree. These workshops can be conducted at a local school or in conjunction with a weekend workshop at some exciting place such as Yellowstone or Glacier Parks.

These projects are involved with the teaching of activities that use a hands-on approach to learning about wildlife, forests and other natural resources. Each encourages inquiry thinking on the part of students and helps each student to develop critical thinking and decision-making skills while learning about our environment.

Each of these facilitators recently received additional updating and training and are ready to go. Many workshops were conducted last year and even more are expected for the coming year. School district math/science funds can be used to support these efforts, if the workshop is conducted as a part of a science inservice.

A brochure is available by writing to Bob Briggs at OPI or Vince Yannoni at the Department of Fish, Wildlife and Parks. A special mailing will be going out to your schools early this fall. Watch for it.



The Case For Microcomputers In Science Education

by Conn McQuinn
Pacific Science Center

Statement: Computers are important tools that should be included at almost all levels of the teaching of science.

Now that the statement has been made, I need to provide "supporting or convincing arguments or evidence." It had better be good, since science education is already expensive and underfunded; to justify the spending of precious resources on relatively expensive materials means showing that computers are more than just handy things to have around.

Two major arguments for the inclusion of computers in teaching science can be made. The first is the vocational argument. "Science is what scientists do"—and scientists now use computers a LOT. Virtually all the major strides today in major areas of science are being aided to a phenomenal degree by the use of computers. The computer's ability to handle and process vast quantities of information is allowing scientists to examine and explore much more information than ever before. The use of robots to explore distant planets and the deep sea adds to the wealth of knowledge. If our students are to grow up and become scientists, computer experience will be a great boon to their success.

However, most of our students will not grow up to be scientists; the odds are much better that they will grow up to be lawyers. Therefore, the second and more important argument for using computers in science education is that their use will increase the effectiveness of the learning that takes place in the science ed classroom. To be an enrichment to the teaching of science, computers need to provide increased opportunities for children to learn, experience and practice the science process skills.

Microcomputer Based Laboratory

Several years ago, Human Relations Media (HRM) Software released a package entitled *Experiments in Human Physiology*. This revolutionary little package did something rather amazing—it turned an average Apple computer into a lab instrument that could measure pulse rate, skin temperature, respiration rate, and combine all three together to operate as a lie detector. This was the first of a series of applications of the microcomputer to become known as the Microcomputer Based Laboratory, or MBL for short.

The operation of an MBL is relatively simple. A small interface device plugs into one of the ports in the computer, usually the game paddle connection. A series of small electronic probes can then be connected to the interface box. The devices now included in some MBL setups include probes to measure light, temperature, sound, galvanic skin response, angle and weight.

Our experience at the Pacific Science Center has shown them to be successful. Providing experimental data rapidly and in graphic form to the students causes them to use many of the science process skills—observing, communicating, comparing, relating, inferring and applying can and do take place in the Microcomputer Based Laboratory.

Data Handling

One of the great strengths of the computer is its ability to store, retrieve and manipulate great quantities of information. The greater ability we can give students to access and interpret this data, the greater the opportunity they have to apply the process skills. If students are being taught to use a database to answer multiple-choice questions, then the computer is doing nothing more than a book could do. If the skill in using the data base is then applied to finding information to compare and relate, and to develop and test inferences, the computer is providing valuable assistance.

Several database and data manipulation applications are just starting to reach the practical stage, and deserve mention. The technology of the laserdisk has spawned two methods of data storage and retrieval now being applied to the microcomputer: the videodisk and the CD-ROM. A laser videodisk can store up to 55,000 single images on one side, up to 30 minutes of moving images, or a combination of both. The playback of these disks can be controlled through a computer. A number of disks are now available that were expressly designed for use in science teaching. They include thousands of images and hundreds of film clips on subjects relating to biology, ecology, geology and astronomy. CD-ROM (that stands for "Capacitance Disk—Read Only Memory") on the other hand, stores verbal data instead of images (for now, others that do both are on the way), LOTS of data—a CD-ROM less than five inches in diameter can store the equivalent of 250,000 single-spaced typewritten pages. Combined with the computer's power to search, sort and retrieve, these new technologies will have a great impact on science education.

Simulations

Using the computer's ability to push around huge numbers, it has become possible to construct computer models of different situations. These simulations can be constructed to mimic predator-prey relationships, the flight of Halley's comet, genetics interactions, physics or chemistry experiments, or any of a number of different events. As just one example of many, I would cite *Geology Search*, published by McGraw Hill.

Geology Search allows students, acting as oil companies, to explore a fictional, newly-discovered continent. Students can perform three levels of testing before choosing a site to drill—density scan, core samples and seismic evaluation. Virtually all of the science process skills are applied in this series of activities—students observe test results, communicate (they need to write reports on their actions), compare sites, organize their data, relate their data through additional tests, infer good drilling sites based on the knowledge they have learned and apply their knowledge by drilling. The same can be said about almost any good simulation. Simulation allows students the freedom to interact and experiment with many different kinds of systems. A good simulation allows students to alter and control variables, monitor results, form hypotheses and re-experiment—which is what science is.

Enough good simulations exist to make this one application of the computer sufficient to justify its inclusion in the science classroom.

Summary

For a number of years now, computers have been viewed with skepticism by many people involved with education. To a very large degree, the skepticism was healthy and justified. Much was being promised with the computers, similar to what people promised with new curricula and technologies before. In addition, many of the early uses of computers in science teaching were little more than electronic books. Now that the technology has had the opportunity to mature, and the early pioneers have had the chance to make their mistakes, a strong case can be made to make computers in the science classroom a high priority. Computers still can't take over teaching, and are just as easily misused and wasted as a microscope or VCR, but thoughtfully applied they can open up new avenues for teachers and students to become involved in the process of science.

A small town is a place where a stranger is either the new teacher or someone who took the wrong freeway exit.

Apples Just Desserts for Teachers

David Wohler, a Billings educator, was recognized recently for his excellence in education. He was presented with a Golden Apple Award and received \$400 and an engraved golden apple at a recognition banquet at 6 p.m., May 13, at the Plaza Holiday Inn. The banquet, which was sponsored by the Teacher Recognition Committee, Billings Chamber of Commerce, Billings Education Association and Billings Public Schools, honored the award recipients and district retirees.

The Golden Apple recipients were selected from among 169 nominations made by students, parents, teachers, administrators and members of the community.

"The only criteria is excellence in education," according to committee member Nancy Jockers, who made the presentation.

Wohler, a biology teacher at Senior High, has been an educator for 20 years. His belief in his students inspires young people to believe in themselves, Jockers said.

Other recipients of the Golden Apple Award were Sherry Miner, Rimrock Elementary School; Carole Jones, Ponderosa Elementary School; Rosemary Hyams, Holy Rosary School; and Anita Dolan, Lewis & Clark Junior High School.

Bill Bartholomew has been getting apples from students for years.

Recently, however, he received an apple of a different kind—it requires metal polish to shine up.

Bartholomew, a science teacher at East Junior High, Butte, was named as Butte's first Golden Apple recipient.

The award, sponsored by the Butte Chamber of Commerce's education committee, recognizes teachers and others in education related fields for exemplary work with students, parents, their peers and the community.

Thirty-seven educators were nominated to receive the awards. The nominees included teachers from Butte's public and parochial schools as well as Butte Vo-Tech and Montana Tech.

Dan Killoy, who served as chairman of the Golden Apple selection committee, said community service by Bartholomew proved to be the main factor in his winning the award.

Bartholomew, now in his 15th year in education, currently teaches life and earth science.

"I've really enjoyed it and have enjoyed the kids," he says. Going from teacher to administrator back to teacher gives him a new perspective on education. "These kids have a lot of ability."

Taking students from the elementary schools and getting them ready for high school is a new task for Bartholomew, and that also offers a new challenge to get students to look at the learning process as much as the subject matter.

The other Golden Apple Award recipient was Madelon Burns.

ELEMENTARY SCIENCE OLYMPIAD



Montana's first elementary school Science Olympiad has just been completed at Lockwood Schools in Billings.

Lockwood Schools in consultation with the Office of Public Instruction in Helena planned the event which included children from kindergarten through 8th grade.

The Science Olympiad is an activities-based science day. Students competed in a variety of events with science processes, concepts and technology. The Olympiad concept is devoted to improving the quality of science education, increasing student interest in science, and providing recognition for achievement in science education by both students and teachers.

Science Olympiad events took place in the Lockwood Schools for grades kindergarten through second on April 22-28; fourth grade on April 30; third and sixth grades on May 1; fifth grade on May 8; and seventh and eighth grades on April 27-May 1.

All the teachers report unqualified success with the kids requesting more! Hundreds of parent volunteers were used as well as student help from the 7th and 8th grades. The event was covered by the Billings Gazette as well as TV stations and 3 hours of video were taken to be used in statewide promotion.

Interested persons are invited to call the following phone numbers for information about this project: Lockwood Primary, 252-2776—K-2nd grades; Lockwood Intermediate, 248-3239—3rd-5th grades; Lockwood Jr. High, 259-0154—6th-8th grades.

Montana Science Teachers Association **Application Form**

Name _____

City _____

County _____

Business Address _____

Home Address _____

Grade

Level

Grades

Taught

Subject

Area

☐ Elementary

☐ High School

☐ College

MSTA will help the individual participate in determining the destiny of science education in Montana. The organization serves as a vehicle for educators from all professions to exert positive influences on young people. Many important decisions concerning the scope and direction of science education will be strongly influenced by our organization.

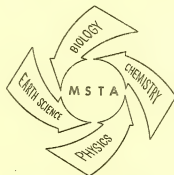
The MSTA goals are to increase public awareness, interest and support of science education in Montana.

Membership Dues are \$8.
 Make checks payable to:

MSTA

Gil Alexander, Treasurer
Helena High School
Helena, MT 59601

Montana Science Teachers Association



*Dedicated to quality
 science education*

Office of Public Instruction
 Ed Argenbright, Superintendent
 State Capitol, Room 106
 Helena, MT 59620